REMARKS

This Amendment is in response to the Office Action dated November 2, 2004. In the Office Action, the Examiner rejected claims 1-8, and 24-28 under 35 U.S.C. § 102(b) as being anticipated by Liang *et al.*, U.S. Patent No. 5,781,529 (hereinafter *Liang*). Claims 9-14 and 16-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Liang* in view of Or *et al.*, U.S. Patent No. 6,532,237 (hereinafter *Or*). Claim 15 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Liang* in view of *Or* as applied to claims 9 and 14 above, and further in view of Eriksson *et al.*, U.S. Patent No. 6,243,384 (hereinafter *Eriksson).*

None of the claims are amended herein. Thus, claims 1-28 remain pending in the application. For the reasons set forth below, the Applicants respectfully request reconsideration and allowance of all pending claims.

Traversal of Claim Rejections under 35 U.S.C. § 102

Claims 1-8, and 24-28 stand rejected under 35 U.S.C. § 102(b) as being anticipated by *Liang*.

A claim is anticipated only if each and every element of the claim is found in a single reference. M.P.E.P § 2131 (citing Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628 (Fed. Cir. 1987)). "The identical invention must be shown in as complete detail as is contained in the claim." M.P.E.P. § 2131 (citing Richardson v. Suzuki Motor Co., 868 F.2d 1226 (Fed. Cir. 1989)). Independent claim 1 recites in pertinent part, "performing at least one diagnostic function on the network switching device in response to information contained in the debug Information Element (IE)." Applicants respectfully submit that *Liang* fails to teach or fairly suggest the use of a debug information element as recited in claim 1.

Liang discloses a system and method for routing ATM switched virtual circuit calls. The Abstract of *Liang* accurately describes how the system and method work:

> The invention routes SVC ATM call setups by utilizing one of a plurality of designated transit lists (DTLs) stored at an originating node. The DTLs describe all routes in the network from the originating node to endpoint destinations. When a call setup message is received at the originating node, it inserts a desired DTL as an information element (IE) of the setup message. Each DTL is formatted as a concatenation of elements with each element including the node ID and output ports of each successive node in the route. Preferably, each element of the DTL includes flags such as a "process" flag which indicates whether an element of the DTL has been processed by a node, a "link up" flag which indicates that an alternative route is available between two nodes should the preferred route be down, a "bandwidth" flag which allows the alternate link to be used if the preferred link is busy, and a "last node" flag which is used in the last element of the concatenated DTL. If the "last node" flag is not set, the destination node internally generates a route ID as the last element based on the destination address specified in an IE for the call. As the DTL IE is passed from node to node along the connection path, the receiving node inserts the input port at which it received the call setup message as well as a VPI/VCI into its element of the DTL. At its destination, the DTL is attached to a CONNECT request message which is returned to the source node.

Under the *Liang* scheme, source routing is used, wherein the entire route used for a call path is predefined using designated transit lists (DTLs) that specify the route to be taken using static routing. At the time of the *Liang* invention, dynamic routing, such as employed by PNNI, was not implemented commercially, as stated in Col. 2, lines 27-37 of the State of the Art section:

> While the dynamic routing such as PNNI has many advantages over static routing such as IISP, PNNI and other dynamic routing techniques have not to date been used commercially because they suffer from the disadvantages of the extreme complexity required by the link state information exchange, as well as the complexities of coordination, management, and processing. In fact, the simpler IISP protocol was specifically introduced as a more simple interim substitute for PNNI because of the complexities of the PNNI routing protocol.

The DTL (designated transit list) defines the hops for an entire switched virtual circuit. *Liang* adds an additional information element (IE) to a CALL SETUP message comprising a Routing DTL (see, *e.g.*, the last IE in the table shown in Fig. 3). Details of the Routing DTL are shown in Figs. 4 and 5. As stated in Col. 7, line 47 – Col. 8, line 8,

> As aforementioned, the CALL SETUP message is formatted with a routing DTL information element, and that information element includes a concatenation of six byte elements which according to a preferred aspect of the invention includes a four bit flag field. In accord with the invention, the four flags include a "process" flag, a "link up" flag, a "bandwidth" flag, and a "last node" flag. The "process" flag is used to indicate whether an element of the DTL has been processed by a node. Thus, when a node receives the DTL, it looks for the first element of the DTL which has not had the process flag set. That element should include the node ID of the receiving node. Upon finding the appropriate DTL element, the receiving node changes the process flag of the element, inserts the input slot ID and input link (i.e., the receiving port) values in their appropriate fields, and designates a VPI/VCI for that element. Then, the receiving node forwards the message with the updated DTL to the output port designated by the DTL (typically via a cross-connect switch) even if peer boundaries are crossed. By utilizing the process flag rather than deleting the DTL element from the DTL, the updated and completed DTL can be sent back from the destination node to the source node as an information element of the connect request message as discussed hereinafter, *or an updated DTL can be sent back from any failure point in the system. The returned information can then be used for diagnostic purposes.* (Emphasis added)

It is clear from above that *Liang* does not employ a debug IE, but rather discloses a Routing DTL IE. Furthermore, with respect to the element of "performing at least diagnostic function on the network switching device in response to information contained in the debug IE," the Examiner states, "*(see col. 3 lines 20-39; the returned information can then be used for diagnostic purposes; col. 2 lines 57-65; and col. 11 lines 44-49).*" Under *Liang*, the Routing DTL IE is clearly not used to cause a network switching device to perform at least one diagnostic function. All that is done by *Liang* relating to diagnostics is for an updated DTL to be sent back from a failure point in the system. All this can do is identify that a failure exists, but does nothing to diagnose what caused or is causing the failure. Furthermore, such a diagnostic function is clearly not being performed by the failed switching device in response to information contained in the Routing DTL IE.

Col. 3, lines 20-39, recite,

> The flags of the DTL provide additional functionality to the routing system. For example, a "process" flag is used to indicate whether an element of the DTL has been processed by a node. Thus, when a node

receives the DTL, it looks for the first element of the DTL which has not had the process flag set. That element should have the node ID matching the ID of the receiving node. Upon finding the appropriate DTL element, the receiving node changes the process flag of the element (rather than deleting the element), and as aforementioned, inserts a VPI/VCI along with the input port designation for its element into the DTL, and forwards the message with the updated DTL to the output port designated by the DTL. *By utilizing the process flag rather than deleting the DTL element from the DTL upon processing, the updated DTL can be sent back from any failure point in the system. The returned information can then be used for diagnostic purposes.* Likewise, and in accord with another aspect of the invention, upon reaching its destination, the DTL is attached to a CONNECT request message which is sent back to the originating node. (Emphasis Added),

while Col. 11, lines 36-49, recite,

> It will be appreciated by those skilled in the art that with the systems and methods described, only the source nodes need store DTLs, as the when CALL SETUP calls are received at intermediate nodes, the DTL will provide the necessary routing information for the intermediate node. In addition, it should be appreciated that the provision of DTLs eliminates the need to access large look-up charts at each node, thereby expediting the process. *A further advantage of the systems and methods of the invention is that detailed information regarding the routing of the SVC calls is obtained, thereby providing useful diagnostic information in the situations where the routing fails, and where the routing is successful.* (Emphasis added)

Clearly, the only thing that is being updated in the CALL SETUP message is the process flag in the DTL element for each node (switch) as the message is passed along the nodal route defined by the DTL used to route the CALL SETUP message. Thus, the only diagnostic information that can be obtained is information identifying whether or not a particular hop between nodes along the virtual path defined by the DTL is available or not.

In stark contrast, under the claimed invention of claim 1, a debug IE is encoded with information to trigger a diagnosis function on a switching device. More specifically, details of one embodiment of the debug ID are shown in Figures 8 and 9, along with corresponding discussion in the specification. For example, the following discussion contained in the specification begins at the top of page 23:

> An exemplary format for implementing the debug IE of the present invention is shown in FIGURE 9. The format includes an 8-bit header 70, an 8-bit protocol field 72, a length of the IE field 74, and a variable-length field 76 in which the contents of the IE are held. In octet 2, bits 7 and 6 are assigned a value of "1 1" to identify that this IE corresponds to the ATM forum specifications. *Bit 5 is set to "1" to indicate that explicit instructions are to be followed. Bit 4 is set to "1" to indicate a pass along request. Bits 3-1 are set to "0 0 1" to indicate to discard the IE and proceed.* **Under this exemplary format, the IE information is encoded such that switching devices that receive the IE and understand the requested action will execute the action, while switching devices that do not understand the action will simply ignore the action and pass the IE along to subsequent switching devices along the connection path**. (Page 23, lines 1-12, Emphasis added)

In one exemplary embodiment, the debug IE content field may contain information that instructs each switching device supplied by a particular vendor (or multiple vendors if a common multi-vendor scheme is adapted) to activate its diagnostic functions, or a particular diagnostic function (page 23, lines 19-22). The debug IE might inform a particular switching device to perform a full set of failure analysis functions, or prescribe only (a) particular function(s) to be run (page 24, lines 16-18).

It is clear from the foregoing that *Liang* clearly does not disclose each and every element and limitation of claim 1. Accordingly, Applicants request the instant §102(b) rejection for independent claim 1 be withdrawn. Additionally, each of claims 2-4 are patentable over *Liang* for at least the same reasons.

Independent claim 24 recites in pertinent part, "performing at least one diagnostic function on a network switching device in response to information contained in the debug IE." For reasons similar to those discussed above, Applicants submit that *Liang* fails to disclose the use of a debug IE containing information used to cause a network switching device to perform a diagnostic function, and consequently fails to anticipate independent claim 24. Accordingly, Applicants request the instant §102(b) rejection for independent claim 1 be withdrawn. Additionally, claim 25 is patentable over *Liang* for at least the same reasons.

With respect to independent claim 5, Applicants respectfully assert that *Liang* does not disclose each and every element and limitation of this claim for similar reasons discussed above in support of the allowance of claim 1. In particular, a failure in a network switching device is not diagnosed by the network switching device in response to a debug IE. Accordingly, Applicants request the instant §102(b) rejection for independent claim 5 be withdrawn. Additionally, each of claims 6-8 are patentable over *Liang* for at least the same reasons.

With further respect to claim 7, this claim recites "... wherein the debug IE includes information specifying a network switching device on which the failure diagnostic function is performed." There is nothing in *Liang* that teaches or suggests such a use. Under this embodiment, a failure point (a node comprising a network switching device) is none. The goal is to determine what is causing the failure. Thus, the debug IE is propagated along a path to the failure point. The other nodes along the path do not employ the diagnostic function because they are not identified by the debug IE.

Independent claim 26 is a Beauregard claim reciting an article of manufacture comprising a computer-readable medium having computer-executable instructions for performing a method analogous to the method recited in claim 5. Accordingly, for reasons similar to those discussed above with respect to the patentability of claim 5, Applicants submit that *Liang* fails to anticipate the claim invention. Accordingly, Applicants request the instant §102(b) rejection for independent claim 26 be withdrawn. Additionally, claim 27 and 28 are patentable over *Liang* for at least the same reasons.

Traversal of Claim Rejections under 35 U.S.C. § 103

Claims 9-14 and 16-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Liang* in view of *Or*. Claim 15 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Liang* in view of *Or* as applied to claims 9 and 14 above, and further in view of *Eriksson*.

To establish a *prima facie* case of obviousness, there must first be some suggestion or motivation to modify a reference or to combine references, and second be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. M.P.E.P. § 706.02(j) from *In Re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Where claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed device; and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a reasonable expectation of success. Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the Applicants' disclosure. *Amgen v. Chugai Pharmaceutical*, 927 F.2d 1200, 18 USPQ2d 1016 (Fed. Cir. 1991), *Fritsch v. Lin*, 21 USPQ2d 1731 (Bd. Pat. App. & Int'f 1991). An invention is non-obvious if the references fail not only to expressly disclose the claimed invention as a whole, but also to suggest to one of ordinary skill in the art modifications needed to meet all the claim limitations. *Litton Industrial Products, Inc. v. Solid State Systems Corp.*, 755 F.2d 158, 164, 225 USPQ 34, 38 (Fed. Cir. 1985).

The examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. M.P.E.P. § 70602(j) from *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Obviousness cannot be established by combining references without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done. M.P.E.P. § 2144 from *Ex parte*

Levengood, 28 USPQ2d 1300, 1302 (Bd. Pat. App. & Inter. 1993) (emphasis added by M.P.E.P.).

Independent claim 9 recites,

9. A method for diagnosing a failure in a connection path comprising a plurality of nodes in a communication network, comprising:

embedding a debug information element (IE) in a data packet;

propagating the data packet to a plurality of switching devices corresponding to respective nodes along the connection path;

extracting the debug IE at selected switching devices among said plurality of switching devices; and

performing at least one diagnostic function on targeted switching devices among said selected switching devices in response to information contained in the debug IE.

As discussed above, all *Liang*'s method does with respect to diagnosing failure is identify the existence of a node failure via the condition of the process flag in the DTL element for that node. With respect to the assertion that *Or* disclosed performing at least one diagnostic function on targeted switching devices among said selected switching devices in response to information contained in the debug IE, Applicants respectfully assert that is clearly incorrect.

Details of the operation of *Or's* apparatus for and method of testing a hierarchical PNNI based ATM network were discussed in the response for the earlier Office Action dated March 16, 2004. As stated in the Abstract, *Or* discloses,

> An apparatus for and method of enabling the debugging and testing of complex multilevel PNNI based ATM networks. The invention has applications in networks wherein one or more nodes implement only the Minimum Function PNNI implementation and wherein these modes must operate correctly in a PNNI hierarchy environment. A plurality of PTSEs representing simulated virtual portions of an ATM network are injected into a node under test. The PTSEs represent hierarchical portions of ATM networks that are difficult or impossible to implement. The virtual portions of the networks may or may not have been able to be created using real physical network elements. The method includes first generating the injection file containing all the PTSEs to be simulated and

then injecting this file into the node under test. The injection process includes reading the ASCII file, parsing the contents and constructing the topology database by processing the binary version of the contents using already existing PNNI processing routines in the switch.

Figure 2 of *Or* illustrates an example hierarchical PNNI ATM network divided into a real physical portion and a simulated virtual portion. Figure 3 of *Or* illustrates the PTSE injection method. Figure 4 of *Or* illustrates the PTSE node incorporation method in more detail. Figure 5 of *Or* illustrates the record that is repeated in the injection output file. Finally, Figure 6 of *Or* illustrates an example virtual hierarchical PNNI ATM network that is simulated and injected into the test node to aid in testing and debugging.

Applicants submit that *Or* fails to teach or suggest method to debug a failed network switching device. The claimed subject matter is non-obvious over the configuration taught in *Or* for several reasons. First, *Or* is directed towards the **simulation** of a virtual ATM network, which **can aid subsequent testing and analysis** of the network. In contrast, the present invention concerns **the actual method for debugging failures** of network switching device(s) in an existing network. Second, *Or* fails to disclose a debug IE encoded with debug information for at least the same reason as discussed above in connection with claim 1. Moreover, *Or* does not disclose or even suggest a network switching device that is configured to perform a diagnosis function in response to information encoded in a debug IE. Furthermore, neither *Liang* nor *Or* teach or suggest propagating an IE across a network to reach a target switching device while transparently bypassing the other switching devices. Consequently, the combination of *Liang* and *Or* fail to expressly or impliedly suggest the invention of claim 9. For the foregoing reasons, Applicants respectfully request that the instant §103(a) rejection for claim 9 be withdrawn.

Amended independent claim 9 recites "a method for diagnosing a failure in a connection establishment path comprising a plurality of nodes in a communication network, comprising: embedding a debug information element (IE) in a data packet;

propagating the data packet to a plurality of switching devices corresponding to respective nodes along the connection path; extracting the debug IE at selected switching devices among said plurality of switching devices; and performing at least one diagnostic function on targeted switching devices among said selected switching devices in response to information contained in the debug IE." Thus claim 9 recites a method to debug multiple failures along a network connection path using debug IEs. Therefore the Applicants submit that claim 9 is non-obvious over *Or* for at least the same reasons discussed above in connection with independent claim 9. Accordingly, Applicants request that the instant §103(a) rejection be withdrawn. Furthermore, each of dependent claims 10-23, which depend either directly or indirectly from claim 9, are likewise patentable over the cited art for at least the same reasons.

CONCLUSION

Overall, none of the references singly or in any motivated combination disclose, teach, or suggest what is recited in the independent claims. Thus, given the above amendments and accompanying remarks, independent claims 1, 5, 9, 24, and 26 are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable based on at least the same reasons and based on the recitations contained in each dependent claim.

If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to the allowability of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 292-8600.

Charge Deposit Account

Please charge our Deposit Account No. 02-2666 for any additional fee(s) that may be due in this matter, and please credit the same deposit account for any overpayment.

Respectfully submitted,

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